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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[Docket No. 111205720-1718-01]

RIN 0648-XA740

Listing Endangered and Threatened Wildlife and Plants; 90-Day Finding on Petitions to List the Thorny Skate (*Amblyraja radiata*) Under the Endangered Species Act

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of 90-day petition finding.

SUMMARY: We, NMFS, announce 90-day finding for petitions to list the thorny skate (*Amblyraja radiata*) under the Endangered Species Act (ESA). We find that the petitions do not present substantial scientific information indicating the petitioned actions may be warranted.

Accordingly, we will not initiate a review of the status of thorny skate at this time.

FOR FURTHER INFORMATION CONTACT: Kim Damon-Randall, NMFS, Northeast Regional Office (978) 282-8485 or Marta Nammack, NMFS, Office of Protected Resources (301) 427-8469. The petition and other pertinent information are also available electronically at the NMFS website at http://www.nero.noaa.gov/prot_res/CandidateSpeciesProgram/csr.htm.

SUPPLEMENTARY INFORMATION:

Background

On August 11, 2011, we received a petition from the Animal Welfare Institute (AWI) requesting that we list, as a Distinct Population Segment (DPS), the Northwest Atlantic

population of thorny skates as endangered or threatened throughout all or a significant portion of its range. In the alternative, AWI asked that we list the U.S. DPS of the thorny skate as endangered. AWI also requests the designation of critical habitat for the thorny skate in U.S. waters.

On August 23, 2011, we received a petition from WildEarth Guardians and Friends of Animals (WEG & FA) requesting that we list thorny skate, barndoor skate, winter skate and smooth skate as threatened or endangered. In the alternative, the petitioners request that we list any and all DPSs of these species that may exist, and, in particular, the petitioners requested that we list the U.S. population of thorny skate as a threatened or endangered DPS.

The joint USFWS/NMFS petition management handbook states that if we receive two petitions for the same species and a 90-day finding has not yet been made on the earlier petition, then the later petition will be combined with the earlier petition and a combined 90-day finding will be prepared. Given that, this 90-day finding will address the AWI petition for thorny skate and the portion of the petition from WEG & FA that addresses thorny skate. The remainder of the WEG&FA petition will be addressed in a separate 90-day finding. In this finding, the AWI and WEG & FA petitions will be referred to as “the petitions,” and the three organizations will be referred to collectively as “the petitioners.”

The petitioners state that there can be no reasonable dispute that the available information, in particular the International Union for Conservation of Nature’s (IUCN) assessment that each of the petitioned species is “Critically Endangered” or “Endangered,” indicates that listing these skates as either threatened or endangered may be warranted. The petitioners claim that the species’ life history characteristics and limited ability to recover in

response to abrupt population declines makes the thorny skate particularly vulnerable to overexploitation. The petitions cite steady declines in biomass indices in the United States since the mid-1970s and claim that unsustainable bycatch mortality and illegal landings threaten the species' survival. The petitioners also state that regulatory mechanisms in the United States and Canada have been insufficient to promote significant stock rebuilding and improve the species' status.

ESA Statutory Provisions and Policy Considerations

Section 4(b)(3)(A) of the ESA (16 U.S.C. 1533(b)(3)(A)) requires that we make a finding as to whether a petition to list, delist, or reclassify a species presents substantial scientific or commercial information indicating that the petitioned action may be warranted. ESA implementing regulations define substantial information as the amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted (50 CFR 424.14(b)(1)). In determining whether substantial information exists for a petition to list a species, we take into account several factors, including information submitted with, and referenced in, the petition and all other information readily available in our files. To the maximum extent practicable, this finding is to be made within 90 days of the receipt of the petition (ESA Section 4(b)(3)(A)), and the finding is to be published promptly in the Federal Register. If we find that the petition presents substantial information indicating that the requested action may be warranted, section 4(b)(3)(A) of the ESA requires the Secretary of Commerce (Secretary) to conduct a review of the status of the species. Section 4(b)(3)(B) requires the Secretary to make a finding as to whether the petitioned action is warranted within

12 months of the receipt of the petition. The Secretary has delegated authority for these actions to the NOAA Assistant Administrator for Fisheries.

To be considered for listing under the ESA, a group of organisms must constitute a “species.” A “species” is defined in section 3 of the ESA to include “any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.” On February 7, 1996, NMFS and the U.S. Fish and Wildlife Service (collectively, the “Services”) adopted a policy to clarify their interpretation of the phrase “distinct population segment of any species of vertebrate fish and wildlife” (61 FR 4722). The joint DPS policy describes two criteria that must be considered when identifying DPSs: (1) the discreteness of the population segment in relation to the remainder of the species (or subspecies) to which it belongs; and (2) the significance of the population segment to the remainder of the species (or subspecies) to which it belongs. As further stated in the joint policy, if a population segment is discrete and significant (i.e., it is a DPS), its evaluation for endangered or threatened status will be based on the ESA’s definitions of those terms and a review of the five factors enumerated in section 4(a)(1) of the ESA (detailed below).

Under the DPS policy, a population segment may be determined to be discrete if: (1) it is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological or behavioral factors; and/or (2) the population is delimited by international boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the ESA.

The DPS policy also cites examples of potential considerations indicating significance, including: (1) persistence of the discrete population segment in an ecological setting unusual or unique for the taxon; (2) evidence that loss of the discrete population segment would result in a significant gap in the range of the taxon; (3) evidence that the DPS represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside of its historic range; or (4) evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

The ESA defines an endangered species as “any species which is in danger of extinction throughout all or a significant portion of its range (ESA section 3(6)).” The ESA defines a threatened species as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (ESA section 3(20)).”

Under the ESA, a listing determination can address a species, subspecies, or a DPS of a vertebrate species (see ESA section 3(16)). Under section 4(a)(1) of the ESA, a species may be determined to be threatened or endangered as a result of any one of the following factors: (A) present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. Listing determinations are to be made solely on the basis of the best scientific and commercial data available, after conducting a review of the status of the species and taking into account efforts made by any state or foreign nation to protect such species.

Species Description

The thorny skate occurs on both sides of the Atlantic. In the western North Atlantic, it ranges from western Greenland to South Carolina, and in the eastern North Atlantic, it ranges from Iceland to the southwestern coasts of Ireland and England (Bigelow and Schroeder, 1953). This species is characterized by a row of 11 to 19 large thorns running down the midline of the back and tail (Bigelow and Schroeder, 1953; Collette and Klein-MacPhee, 2002). Thorny skate are generally brown dorsally with a white ventral surface. They may reach lengths of over 39 inches (991 mm), but maximum size varies over its range.

According to Collette and Klein-MacPhee (2002), females deposit a single fertilized egg capsule which ranges in size from 2 to 4 inches (48 to 96 mm) in length and 1.33 to 3 inches (34 to 77 mm) in width. While females with fully formed egg capsules are captured year round, the percentage of mature females with capsules is highest during the summer (Collette and Klein-MacPhee, 2002). Thorny skate feed on benthic invertebrates and fish. Thorny skates are found over a wide variety of substrates including sand, broken shell, gravel, pebbles, and soft mud and are primarily found from 20 to 3,900 feet (18 to 1200 m) deep (Collette and Klein-MacPhee, 2002). They appear to make seasonal migrations that have been noted on the Scotian Shelf and the Grand Banks, but specific details on the spatial patterns and timing are lacking (NEFSC, 2003). Kulka and Miri (2003) report a change in the spring and fall distributions resulting in a higher density and greater proportion of biomass being found in deeper waters during the spring. These aggregations, they note, appear to be correlated with warmer relative temperatures.

Sulikowski et al. (2005) aged thorny skate in the Gulf of Maine and estimated the oldest age to be 16 years for both males and females. For females, 50 percent maturity occurred at

approximately 11 years and 875 mm (34.5 inches) total length (TL); while for males, approximately 10.9 years and 865 mm (34 inches) TL (Sulikowski et al., 2006).

Analysis of Petition and Information Readily Available in NMFS Files

The following sections contain information found in the petition and readily available in our files to determine whether a reasonable person would conclude that an endangered or threatened listing may be warranted as a result of any of the factors listed under section 4(a)(1) of the ESA.

Analysis of DPS Information

The AWI petition claims that the Northwest Atlantic thorny skate population, encompassing Canadian and United States waters, satisfies both the “discrete” and “significant” requirements for DPS designation. AWI argues that the Northwest Atlantic population is discrete because it is markedly separated from other populations due to physical and biological factors, and significant because loss of the DPS would result in a significant gap in the taxon’s range. AWI acknowledges that scientific literature on thorny skates demarcates the Northwest and Northeast Atlantic populations. AWI states that research indicates that small groups of thorny skates may make limited seasonal migrations, but it is generally considered a sedentary species. In addition, they state that there are no scientific studies that indicate trans-Atlantic migration or significant genetic interface between the Northwest and Northeast Atlantic stocks.

The AWI petition also presents an alternative justification for considering the thorny skate population in United States waters as a DPS. The petition claims that the United States population is discrete because it is delimited by international governmental boundaries (delineating the United States and Canada) and significant differences exist in the control of

exploitation, conservation status, and regulatory mechanisms. They further claim that evidence suggests that the U.S. DPS may be discrete because it is markedly separated from the Canadian population as a consequence of physical and/or ecological factors and that the U.S. population meets the significance criterion of the DPS policy because the loss of the DPS would result in a significant reduction in the range of the taxon. The AWI petition states that the thorny skate is managed as a single stock in Canada which dominates Canadian commercial catches, representing approximately 95 percent of the total skates caught. The petitioner contrasts this with the situation in the United States where there is no directed fishery, claiming the population decline is attributed to retained incidental catches, bycatch, and discard mortality. The petitioner also states that the Canadian population has stabilized, whereas the U.S. population is being overfished and continues to decline.

WildEarth Guardians and Friends of Animals request that if the Secretary determines that the thorny skate is not threatened or endangered throughout all or a significant portion of its range, that the population of thorny skates in U.S. waters be listed as threatened or endangered as a DPS. The petitioners claim that the U.S. population of thorny skate is discrete from the Canadian and Northeast Atlantic skate populations because fish in the Gulf of Maine are larger, produce larger egg capsules, and have distinct behavior characteristics. They specifically cite different diets and the year-round reproduction of thorny skates in the Gulf of Maine compared to autumn reproduction of thorny skates in the Grand Banks. Furthermore, they state that studies of skate migration demonstrate that, although thorny skates undergo seasonal migrations from shallow to deeper waters, they do not undergo any longer-range migrations, nor do they move far from their starting location during their lifetimes. The petitioners also note that the U.S. and

Canadian populations of thorny skates are separated by an international boundary and state that the conservation status of thorny skates varies significantly across the U.S./Canadian border and that the regulatory regimes also differ significantly across the border.

The petitioners assert that the U.S. population of thorny skates meets several of the criteria for significance including that it persists in an unusual and unique ecological setting for the taxon because thorny skates off the U.S. coast represent the southernmost population of the species in the world. They state that, as global temperatures rise, these adaptations to warmer temperatures will become even more important to the species' survival, and, therefore, conservation of the U.S. population with its particular warm-water adaptation is essential to the conservation of the species as a whole. They further claim that loss of the U.S. population would result in a significant gap in the range of the species because it would result in the extirpation of the species from several hundred miles of the continental shelf where it is now viable. Finally, they indicate that evidence suggests that the U.S. thorny skate population exhibits genetic characteristics that differ from those of other populations of the species.

The petitioners cite thorny skate tagging studies as evidence of their relative lack of dispersal and high site fidelity, but these studies actually provide a more complex view. Templeman (1984) states that most thorny skates were recaptured within 60 miles (97 km) of their tagging location, but also that 13 percent of skates were recaptured 100 to 240 miles (161 to 386 km) from where they were tagged. Some of these moved considerable distances over short durations. Templeman (1984) concluded that thorny skates are capable of longer migrations than other skates that have been studied.

The thorny skate ranges across the entire North Atlantic Ocean, and recent population

genetics research indicates that there is little structure in populations across its range (Chevolot et al., 2007; Ostrow et al., 2008). These results would argue against the existence of a U.S. or Northwest Atlantic DPS, and instead may indicate that these areas are components of a larger panmictic stock, connected by large-scale dispersal of individual skates (Chevolot et al., 2007). The petitioners state that “there are no scientific studies that indicate trans-Atlantic migration or significant genetic interface between the Northwest and Northeast Atlantic stocks.” However, Chevolot et al. (2007) examined the mitochondrial DNA of thorny skates sampled from Newfoundland, Iceland, Norway, and the North Sea regions, and found that genetic diversity was relatively homogeneous across all sites. They concluded that “the migratory range [of the thorny skate] is much greater than previously acknowledged.” Recent DNA microsatellite analysis has also revealed that there is no significant genetic structure for thorny skates within the Gulf of Maine, or between the Gulf of Maine and Canada (Ostrow et al., 2008). Chevolet et al. (2007) note that the near absence of genetic differentiation in thorny skate over the North Atlantic does not conform to predictions based on life history characteristics and acknowledge that the lack of power related to small sample size and the use of only one molecular marker might provide an explanation. However, they note that a parallel study using the same marker for another skate species did find strong and highly significant structure at the ocean basin scale. Existence of a Northwest Atlantic or a U.S. DPS is not well supported by the available genetics studies because these do not indicate significant differences that would be evidence of discreteness.

Given these genetic and tagging study results, we do not find that the petitioners have presented substantial scientific information supporting the delineation of a Northwest Atlantic DPS or a U.S. DPS of thorny skates. The petitioners did present information about differences in

management regimes in the United States and Canada for consideration of a discreteness determination under the DPS policy. The petitioners did state that “the differences in regulatory regime, control of exploitation, and conservation status across this border further indicate that the U.S. population is “discrete” within the meaning of the DPS policy.” The DPS policy requires identifying differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms and an explanation of how those differences are significant in light of section 4(a)(1)(D) of the ESA. The petitioners did not present information on differences in management regimes between the United States and Northeast Atlantic. Sufficient time is not available within the 90-day initial petition review phase to conduct a review of international regulations, so for the purposes of this finding and to err on the side of the species, we consider the species range-wide as well as assume that a U.S. population of thorny skates could be demonstrated to constitute a DPS.

Abundance

The petitioners cite the 2008 Skate Stock Assessment and Fishery Evaluation (SAFE) Report prepared by the NEFSC as demonstrating a precipitous decline in thorny skate abundance and biomass in U.S. waters since the late 1970s. The AWI petition states that the most recent 3-year average mean biomass survey from 2008 – 2010 (0.245 kg/tow) is the lowest in the time series.

The petitioners state that the IUCN lists the U.S. population of thorny skates as “Critically Endangered” and the Canadian population as “Vulnerable” throughout its range in the Northwest Atlantic Ocean. They conclude that the IUCN listing rubric is stricter than the ESA listing rubric because the IUCN designates a species as “Critically Endangered” when it is

“considered to be facing an extremely high risk of extinction in the wild” and “Vulnerable” when it is “considered to be facing a high risk of extinction in the wild,” and the IUCN only lists a species or population if it is facing extinction rangewide.

The Northeast Fisheries Science Center (NEFSC) has monitored skate biomass annually in its bottom trawl survey since 1963. This survey is the only source of information on the relative abundance of thorny skates in U.S. waters, which are primarily distributed in the Gulf of Maine. Based on this information, the survey biomass index of thorny skates has steadily declined from a high 3-year average of 6.17 kg/tow in 1969-1971, to a low of 0.26 kg/tow in 2008-2010 in U.S. waters. We note that the AWI petition compares the biomass index to the formerly used reference point (4.41 kg/tow) and not the updated biomass target (defined as the stock biomass that would produce maximum sustainable yield) and thresholds (defined as an unacceptably low biomass) (4.12 kg/tow and 2.06 kg/tow, respectively) adopted by the Data Poor Stocks Working Group (DPSWG) and Amendment 3 to the Skate Fishery Management Plan (FMP) in 2009. For thorny skate, the 2008-2010 NEFSC autumn average biomass index of 0.26 kg/tow is well below the biomass threshold reference point (2.06 kg/tow), indicating that the species is in an overfished condition. The 2008-2010 index is lower than the 2007-2009 index by 4.4 percent, but overfishing is not occurring as this decline is not more than 20 percent.

AWI further states that Canadian indices of thorny skate have also demonstrated a precipitous decline over the past 4 decades and cites evidence of a hyper-aggregation with 80 percent of the biomass now concentrated in 20 percent of the area along the southwest slope of the Grand Banks (Kulka et al., 2007). As noted by Kulka et al. (2006), in the early 1980s, thorny skates were distributed over the entire Grand Banks in moderate to high concentrations, but by

the late 1990s, much of the biomass was concentrated in the southwest. The proportion of the surveyed area containing no skates increased from about 2 percent in 1980-1988 to 22 percent in 2004-2005. During 1980-1988, about 57 percent of the biomass was located within 20 percent of the survey area, and by 2001-2005, 78 percent of the biomass was located within 20 percent of the survey area. Therefore, the area occupied by thorny skates has decreased, and the population has become increasingly more concentrated in a smaller area where bottom temperatures are warmest. A very similar pattern of aggregation was observed for northern cod just prior to its collapse (Rose and Kulka, 1999). Kulka and Miri (2003) state that aggregation and reduced area of occupancy led to the cod being increasingly more vulnerable to exploitation, and they state this is very similar to what is happening to thorny skate. They do acknowledge that it is unknown whether these spatial dynamics are an indication of a skate stock under stress. The 2007 update by Kulka and Miri noted that the species had shown a minor re-expansion in its distribution in the past 3 to 4 years (Kulka and Miri, 2007).

Kulka and Miri (2006) noted that the average weight of thorny skate in Canadian surveys had declined from 2 kg in the early 1970s to 1.2 kg in 1996, with the majority of this decline occurring in the 1990s concurrent with the decline in survey biomass. They reported that average weight had increased to about 1.6 kg since 1996. They note that the decline of thorny skate, particularly on the northern Grand Banks, is concurrent in space and time with the decline of many other demersal species and occurred during a period when bottom temperatures were below average.

The IUCN reviewed the status of thorny skate in 2004 and concluded that the extent of decline warranted a global assessment of “vulnerable,” but “critically endangered” in U.S.

waters. They noted that the species was relatively stable in recent years in Canada and the Northeast Atlantic, yet declining in the United States. The species was assessed as a species of Least Concern in the Northeast Atlantic. They also noted that the overall abundance (whether divided among subpopulations or not) still constitutes several hundred million individuals. Spring surveys on the Grand Banks indicate a minimum biomass estimate for the Northwest Atlantic of 100,000 tons that has been stable or increasing slightly over the last 15 years, as reported in the 2004 IUCN assessment. The reasons cited for the “critically endangered” classification for U.S. waters include low relative abundance below the fisheries limit reference point, the long-term population decline, lack of population increase with strict management laws, and the inability to monitor species specific landings.

For the Northeast Atlantic, the IUCN assessment states that the species is common and is the most abundant skate in the North Sea and has shown a marked increase between 1970 and 1983 in the Central North Sea and from 1982 to 1991 in English groundfish surveys.

ESA Section 4(a)(1) Factors

The AWI petition presents information on the five ESA factors but states that the continued survival of the Northwest Atlantic DPS of thorny skates is endangered by the following three of the five factors enumerated in the ESA: (B) overutilization for commercial, recreational, scientific, or educational purposes; (D) inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors.

WildEarth Guardians and Friends of Animals claim that thorny skate are threatened by direct and indirect exploitation. They state that the life history of thorny skate, which makes it

especially vulnerable to exploitation, argues even more urgently for the adoption of strong regulatory protections provided by the ESA.

Present or Threatened Destruction, Modification or Curtailment of Habitat or Range

The petitions state that bottom trawl fisheries are responsible for up to 86 percent of the thorny skate caught as bycatch in the United States and that trawling in general has been shown to have negative impacts on benthic communities, but acknowledge that there are no direct studies quantifying the impact of trawling on thorny skate habitat in the Northwest Atlantic.

The petitions state that research indicates that the use of groundfish trawling gear degrades benthic habitat structure by removing or damaging epifauna, reducing bottom roughness, and removing structure forming organisms. They claim that such habitat degradation affects the availability of the thorny skates' prey as well as the skate's ability to avoid predators. They further note that although thorny skate were once found throughout Grand Banks, 80 percent of the survey biomass in Canadian surveys is now concentrated into 20 percent of the area along the southwest slope of the Grand Bank. They cite the IUCN report statement that a similar pattern of hyper-aggregation was observed immediately before the collapse of a cod population. Information in the petitions and readily available in our files does not indicate that thorny skate may be threatened or endangered due to present or threatened habitat destruction, modification or curtailment.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The AWI petition states that population estimates for the thorny skate in Canadian waters indicate stable, but not increasing numbers; in U.S. waters, survey biomass indices have been declining for decades, despite the Federal ban on the landing and possession of thorny skates

since 2003. The petition claims that reports of illegal thorny skate landings suggest that thorny skates are being exploited in the commercial wing market. AWI also cites concern over discards and discard mortality, with NEFSC assuming 50 percent discard mortality rate. WildEarth Guardians and Friends of Animals raise concern that the directed skate take will likely continue to increase as the use of other groundfish becomes more restricted and less profitable. They also claim that as long as the skate bait and wing trade continues to target the smaller little and winter skates, thorny skates will also be threatened. They also express concern over thorny skate discards and cite studies off Australia and the Falkland Islands suggesting that acute discard mortality rate may be as high as 56 percent. They cite the 2005-2007 average thorny skate biomass index reported by the NEFSC as 0.42 kg/tow and state that is well below the biomass threshold of 2.2 kg/tow. Finally, they cite the 2005-2007 average biomass index as being 24 percent lower than the previously reported average biomass (0.55 kg/tow, 2004-2006) as evidence that unsustainable take is still occurring. Skates are harvested in two very different fisheries, one for lobster bait and one for wings for food. The fishery for lobster bait is a more historical and directed skate fishery, involving vessels primarily from Southern New England ports that target a combination of little skates and to a much lesser extent juvenile winter skates. The fishery for skate wings evolved in the 1990s as skates were promoted as an underutilized species. The wing fishery is a more incidental fishery that involves a larger number of vessels located throughout the region. Vessels tend to catch skates when targeting other species such as groundfish, monkfish, and scallops and land them if the price is high enough (NEFMC, 2009).

Thorny skates in the Atlantic U.S. Exclusive Economic Zone have been managed under authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-

Stevens Act) by the New England Fishery Management Council's fishery management plan for the Northeast (NE) Skate Complex (Skate FMP) since September 2003. Since that time, possession and landing of thorny skates has been prohibited, but the survey biomass index has continued to decline. It is important to note that based on the limited productivity of this species (long-lived, late maturity, low fecundity, etc.), rebuilding to target levels (4.12 kg/tow) was estimated to take at least 25 years (i.e., 2028) (NEFMC, 2009). The thorny skate's low productivity makes it vulnerable to exploitation, but also suggests that the population is inherently slow to respond to fishery management efforts. Elasmobranch fishes are very resilient and mobile species that move when environmental conditions change to suboptimal levels. This suggests that if thorny skates are sensitive to environmental changes (e.g., increasing bottom water temperatures), they would likely emigrate to other more suitable habitat. Rather than dying off, the population may be shifting en masse to deeper or more northern waters outside the Gulf of Maine survey area. Such population shifts have been documented in the winter skate (Frisk et al., 2008), and are also likely contributing to the increasing survey biomass for barndoor skate.

Research on the discard mortality rates of winter, little, thorny, and smooth skates in bottom trawl gear is currently being conducted by Drs. John Mandelman (New England Aquarium) and James Sulikowski (University of New England) (NOAA Saltonstall-Kennedy Grant Program). Preliminary data provided to NMFS and the Skate Plan Development Team (PDT) indicate that discard mortality rates are significantly lower than the 50 percent previously assumed by the NEFSC. The preliminary discard mortality rate estimate for thorny skate (up to

72 hours post-release) is only approximately 12 percent (n=188), suggesting that this species is relatively resilient to discarding.

The petitions make a number of inaccurate assertions about misreporting and underreporting of discard rates. AWI incorrectly claims that the discard rate is contingent on the fishers' self-reporting. In fact, discard rates are estimated by using independent observers, who are randomly assigned to sample a fraction of the fleet using a scientific survey approach. As a result, the estimates are highly precise. AWI also erroneously assumed that the numbers in the Skate PDT Document have a large margin of error. Table 7A in the SBRM report, however, shows an overall coefficient of variation of about 5 percent for 2009, 2010, and 2011 (Wigley et al., 2011).

Amendment 3 to the Skate FMP was designed, in part, to end overfishing and promote rebuilding of overfished thorny skate to achieve the biomass target within the mandated rebuilding schedule, or earlier if possible, and to prevent overfishing of all managed skates. Amendment 3 and the associated Final Environmental Impact Statement (FEIS) conclude that the landings and catch limits proposed by the amendment have an acceptable probability of promoting biomass growth and achieving the rebuilding (biomass) targets for thorny skates.

Based on new life history parameter estimates, the Council estimated in 2003 that it takes a female thorny skate 15 years to replace its own spawning capacity, which by definition is a mean generation time. Thus, the maximum rebuilding period allowed by the MSA is 25 years (10 years plus one mean generation time), or 2028 when counted from the FMP implementation in 2003, when thorny skate was determined to be overfished. From the biomass in 2007 (0.42 kg/tow), it would take an average annual increase of 13.2 percent to rebuild to the 4.41 kg/tow

target by 2028. The PDT advised the Council that the best estimate of the maximum intrinsic rate of population growth is 0.17, so achieving the biomass target within the rebuilding schedule appears to be achievable. The purpose of this analysis is to estimate the ability of the thorny skate's population to grow based on its biological limitations. It is most appropriate to use the maximum intrinsic rate of increase because that provides the benchmark for how quickly the stock can potentially rebuild to the target under optimal conditions. The fishery management plan should attempt to provide those conditions.

Regarding the petitioner's concern over the vulnerability of thorny skates to the skate wing fishery, according to port sampler data provided by the NMFS Northeast Region Analysis and Program Support Division, the occurrence of thorny skates in skate wing landings has been significantly reduced since 2006. Out of 50,653 skate wings sampled between 2007 and 2010, only 353 (0.7 percent) were identified as thorny skate wings. There has been a general decline in the presence of thorny skates in the wings sampled as reflected in the following data: 9.22 percent in 2006; 1.54 percent in 2007; 0.13 percent in 2008; 0.43 percent in 2009; and 0.61% in 2010. This suggests that the current possession prohibition is very effective at minimizing fishing mortality on this species (particularly when considered in conjunction with the recent data on discard mortality). The Skate FMP implemented species-specific reporting codes for landed skates, but most skate wing landings are reported as Skate Wings (code 3651) or Winter Skate (code 3671). The argument that the lack of species-specific reporting in the skate fishery somehow promotes illegal thorny skate landings is flawed. Based on the port sampler data, we know that thorny skates are currently extremely uncommon in fishery landings, although illegal landings may have been more common in the past (NEFMC, 2009).

The statement in the petitions that thorny skate distribution overlaps with the distribution of winter skate and its directed fisheries is exaggerated. Thorny skates are primarily distributed in the deeper waters of the Gulf of Maine, while winter skates are distributed on Georges Bank and into southern New England shelf waters. There is actually very little overlap between thorny and winter skates and the fisheries that interact with them.

In 1995, Canada established a regulated skate fishery inside its 200-mile limit following the collapse of major groundfish stocks in Canada in the early 1990s (Kulka and Miri, 2003). Since the mid 1980s, Spain, Portugal, and Russia have prosecuted a directed fishery for skate outside of Canada's 200-mile limit on the Tail of the Grand Banks (Kulka and Miri, 2003).

The IUCN assessment of the Northeast Atlantic states that thorny skates are occasionally landed as bycatch of demersal fisheries, but its distribution lies outside the main beam trawling areas. It states that thorny skate has a relatively small length at first maturity and demographic modeling suggests that it is less susceptible to fishing mortality in this region than other larger bodied skate species.

In the United States, thorny skates are currently categorized as overfished, but overfishing is not occurring. The available information indicates that previous fishing levels are responsible for the current low abundance of the species. Given the species' life history, recovery from these low levels was predicted to take a significant amount of time, and current observations demonstrate that the 2003 FMP's rebuilding schedule is achievable. Therefore, no substantial scientific information has been presented to indicate that current discards or illegal landings in the wing fishery pose a significant threat to the species.

Predation and Disease

The petitioners claim that even a normal rate of predation could have a significant impact on the already severely depleted thorny skate population and states that the Secretary should fully consider the risks posed to the thorny skate population from predation in assessing the status of the species. They also state that thorny skates are host to a wide variety of parasites and again state that the Secretary should fully consider the risks posed to the thorny skate population by parasitism in assessing the status of the species. The petitioners state that disease and predation are not currently assessed as significant threats to the species' survival. Thus, there is no information in the petitions nor is there any in our files that suggests that disease and predation are significant factors affecting the continued existence of this species.

Inadequacy of Existing Regulatory Mechanisms

The specific regulatory concerns cited in the AWI petition include a general lack of species-specific identification, both on-boat and at landing. The petitioner states that positive species identification at landing is hindered because current regulations allow vessels to possess and/or land skates as wings only (wings removed from the body of the skate and the remaining carcasses discarded). AWI also states that the designation of thorny skates as both prohibited and overfished allows room for inconsistent enforcement of the law. Specifically, they highlight the different penalties for violations of taking or retaining overfished species compared to possession of prohibited species. The petition states that the existing regulatory mechanisms in the FMP are inadequate to promote the recovery of the thorny skate in U.S. waters and may actually be sponsoring the species' continued decline. Finally, the petition also states that Canada lacks substantive protective regulatory mechanisms for thorny skate and has not afforded

a conservation status by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

The petitioners state that data on skate discard rates are “contingent on the fishers’ self-reporting.” This is not accurate; discard rates are estimated based on skate discards sampled by at-sea observers, and extrapolated based on the magnitude of landings. Based on new research, the 2008-2010 discard mortality rate (the percentage of skates that die after they are thrown overboard) of 50 percent for both little and winter skates caught by trawl gear was reduced from 50 percent to 20 and 12 percent, respectively. As a result, the skate discard rate (the percentage of the total annual catch represented by dead discards) was reduced from 52 to 36 percent (NMFS, 2011).

The petitioners state that over 99 percent of all landings are reported as “unclassified skates,” and state that because the species-specific reporting requirements are not enforced, the prohibition on possessing thorny, barndoor, and smooth skates is essentially meaningless. They further state that the FMP only requires vessels to report discarded skates by size as either small or large. The petitions state that even if the regulations prohibiting landing and possession of thorny, barndoor, and smooth skates were effectively enforced, they would do nothing to prevent discard mortality, which may account for a large percentage (even the majority) of human-induced mortality in these species.

The potential impact of the lack of species-specific reporting in the skate fishery on the survival of thorny skates is overstated. While the historical lack of species-specific trends in landings and discards has hampered stock assessment efforts, recent data collection efforts have greatly improved our understanding of the species composition of the landings. Over the last

several years (2005 to 2010), the prohibitions on thorny, barndoor, and smooth skates have been estimated to be approximately 98 percent effective (NMFS Northeast Region, unpublished data). Thorny skate wings are easily distinguishable from legal winter skate wings with a minimal amount of training, and port samplers and enforcement agents have received this training. Landing of thorny skates may have been more frequent in the past, but it has been dramatically curtailed since the prohibition on possession went into effect. Mislabeling of skate products does not appear to be widespread at U.S. ports, and enforcement agents have been trained to correct mislabeling if they observe it.

While the 2008-2010 3-year average biomass survey index represents the all-time low in the time series for thorny skate, the biomass survey index increased modestly in 2009 and 2010. The petitioners argue that the Skate FMP has proven “inadequate to promote the recovery of thorny skate in United States waters and may actually be sponsoring the species’ continued decline” but have not presented substantial scientific information to support this claim. The Skate FMP (including the prohibition on possession of thorny skate) was implemented 8 years ago, and Amendment 3, which established the first annual catch limits for skates and defined the rebuilding timeline for thorny skate, was only implemented in July 2010. These actions do not provide evidence of a lack of regulatory control; rather, they indicate that significant efforts have been implemented to protect thorny skates using existing regulatory mechanisms. The information presented by the petitioner and otherwise available to us does not lead a reasonable person to conclude that the low abundance of thorny skate is due to a current lack of regulations in place. Given the low productivity of thorny skates, it is likely to take several more years before the survey biomass index properly reflects the impacts of these fishery management

decisions. Therefore, the AWI petition does not present substantial scientific information to lead a reasonable person to conclude that thorny skates are threatened or endangered due to inadequate regulatory mechanisms.

Other Natural or Manmade Factors Affecting Its Existence

The third factor cited by AWI as a reason for listing is other natural or manmade factors. Specifically, they claim that global warming poses a long-term threat to Northwest Atlantic thorny skates and their recovery from depletion. The petition claims that ocean temperatures are rising, and this along with an increase in global temperatures causes adverse effects on thorny skate.

The petitioners state that the life history characteristics of large-sized skates make them particularly vulnerable to exploitation. They state that thorny skate are not likely to recover quickly from their current low levels, especially in the face of continued overutilization. One of the petitions states that evidence suggests that a recent decline of thorny skates in the northern part of the Grand Banks correlates with a period of abnormally cold water temperatures and concludes that the thorny skate population may be threatened by changes in average water temperatures caused by climate change. They suggest that the Secretary should fully consider the possible threat of climate change to the thorny skate population in assessing the status of the species.

The other petitioner hypothesizes that global climate change, and rising ocean temperatures in the thorny skate's range, may pose a direct threat to the species' survival. Little specific information is provided to link climate change to specific impacts on thorny skate. One possibility is that global warming could cause a range shift (e.g., northward distribution shift) of

the thorny skate population. This could result in lower abundance in the southern fringe of its range (i.e., a contraction or movement out of the Gulf of Maine to colder waters, rather than an actual decline in overall biomass). More research is necessary to investigate if there is a correlation between Gulf of Maine water temperatures and thorny skate biomass, but the available information on thorny skate temperature preferences suggests that this could be a possibility. However, rather than contributing directly to natural mortality of thorny skates, it is more likely that such temperature changes would result in large-scale distribution shifts over time. In the 2020 to 2060 time period, bottom temperatures in the Gulf of Maine are projected to increase by about 1°C across three emission scenarios examined (Hare et al., in press). In the 2060 to 2100 time period, the changes in temperature differ among the emission scenarios. Under the B1 scenario (lower emissions), bottom temperatures are projected to increase by ~1.8 °C. Under the A1B and A2 scenarios (higher emissions), bottom temperatures are projected to increase by approximately 2.4 °C. There is not much difference between the A1B and A2 scenarios because under these scenarios, CO₂ emissions do not start to diverge until the end of the 21st century (Nakicenovic et al., 2000). The impact of these projected temperature changes on thorny skate and its habitat is unknown at this time.

There is uncertainty regarding the role of temperature in driving or contributing to the historical and current distribution and abundance of thorny skate and even greater uncertainty regarding potential future impacts of climate change on the species throughout its range. Given the above, the petitions and available information in our files do not lead a reasonable person to conclude that other natural or manmade factors may cause thorny skates to be threatened or endangered at this time.

Critical Habitat

The petitioners request that we designate critical habitat for thorny skates, upon finding that the species is endangered or threatened. They state that research has found that thorny skates prefer sand, gravel, broken shells, and soft mud substrata at depths between 37 and 108 meters and, therefore, state that habitat conforming to these specifications is essential to the conservation of thorny skates. Accordingly, the petitioners request that we designate as critical habitat all areas along the U.S. coast from the Gulf of Maine to South Carolina featuring these characteristics.

Similarity of Appearance Provision of the ESA

The petitioners state that if we determine that some of the skate species included in the petitions warrant listing while others do not, we should nonetheless list those species not found to be threatened or endangered, as well as other members of the skate complex, as listed species in accordance with section 4(e) of the ESA. They argue that while it is already difficult to differentiate skates by species, it is even more difficult to differentiate skate wings by species. They raise particular concern over the risk of confusing juvenile winter skates and little skates, which they state would make the enforcement of a prohibition on take of winter skates extremely difficult. The petitioners claim that the problems with species differentiation and enforcement of species-specific take prohibitions demonstrate that enforcement will not be effective unless we treat all members of the skate complex as subject to the same regulations.

Conclusion

Scientific information presented by the petitioners and otherwise available to us indicates that it is unlikely that the Northwest Atlantic population of thorny skates is discrete and

significant. Contrary to the petitioner's assertions, there is no evidence of reproductive isolation of any subpopulation of thorny skate across the North Atlantic Ocean. Connectivity across broad geographic regions reduces the overall risk of extinction, and buffers the potential impacts of fishing mortality on thorny skates. An argument could be made for discreteness and significance of the U.S. population of thorny skates if it could be demonstrated that this population is delimited by international boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the ESA. Sufficient time is not available within the 90-day initial review phase to conduct a review of international regulations, so for the purposes of this review and to err on the side of the species, we have examined the species range-wide and as a U.S. population of thorny skates (assuming that it meets the DPS policy criteria).

Given this assumption, we have considered the available information on biomass. Range-wide, it indicates a decline, and in the United States, surveys indicate that the population is at a historically low level; although the species may be at a low level and may have declined from previous historical levels, sufficient information was not presented to indicate that it is now threatened or endangered due to that low level of abundance. Millions of thorny skate exist and their distribution ranges across vast areas on both sides of the North Atlantic. We have also examined the five ESA section 4(a)(1) factors and specifically examined whether sufficient scientific information was presented by the petitioners or otherwise readily available in our files that indicates that thorny skates are threatened or endangered due to overutilization for commercial purposes or inadequacy of existing regulatory mechanisms to control harvest (including discards and illegal landings). The purported impacts of illegal fishery landings and

high discard mortality in U.S. waters are not supported by the most recent fishery data. In fact, the Skate FMP's prohibition on possession of thorny skates appears to be extremely effective, and discard mortality rates are relatively low. While it is reasonable to predict that climate change will result in some changes to the habitat of thorny skate, sufficient information is not presented or otherwise available to indicate that climate change, or other natural or manmade factors, may be causing the species to be threatened or endangered. We conclude that the available information does not lead a reasonable person to conclude that thorny skates are threatened or endangered due to one or more of these factors at this time. However, to meet stock rebuilding objectives under the Magnuson-Stevens Act, the Council should be encouraged to maintain its efforts to reverse the decline of thorny skates. Additional research on several key aspects of thorny skate population dynamics could further inform management, particularly on the potential impacts of rising ocean temperatures on their distribution. This is currently being investigated by the NEFSC. Additionally, we will retain thorny skate on our Species of Concern list and attempt to devote resources to addressing the data deficiencies. Should these research efforts yield information not considered in this finding, we may initiate a review of the status of this species in the future.

Petition Finding

Based on the above information and the criteria specified in 50 CFR 424.14(b)(2), we find that the petitions and information readily available in our files do not present substantial scientific and commercial information indicating that the petitioned actions concerning thorny skate may be warranted at this time. Because we have concluded that the petitioned action to list thorny skates is not warranted, we do not need to explore the need to designate critical habitat or

consider the need to list other skate species on the basis of similarity of appearance, as requested by the petitioner.

References Cited

A complete list of the references used in this finding is available upon request (see ADDRESSES).

Authority: 16 U.S.C. 1531 et seq.

Dated: December 14, 2011.

Samuel D. Rauch III,
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National Marine Fisheries Service.

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